THE WELIN DAVIT & ENG. Co. Ltd.

INSTALLATION, OPERATING & MAINTENANCE INSTRUCTIONS.

WELIN REFERENCE Nº: 9120/1-2

SHIP'S NAME :

OWNERS :

SHIPBUILDERS Burrard Dry Dock Ltd.

SHIP Nº: Hull 221 : G. & M. design 1080

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

FOR SPECIAL 'LUM' DAVITS WITH MOTORISED MAIN

& FALLS TENSIONING WINCHES AND MOTORISED LUFFING

CONTENTS

WELIN LITERATURE SHEETS

Welin	1138.A.	- Frames, Arms, Lead Blocks, Shock Absorbers.	
	1138.B.	- Winches, Limit Switches	INSTALLATION
	1138.C.	- Rope Reeving	
	1138.D.	- Launching Boat	
	1138.F.	- Recovering Boat	OPERATION
	1138.H.	- Falls Tensioning General	
	1138.J.	- Maintenance of Davits, Winches	
	1138.K.	- Electro-Magnetic Brakes	
	1138.Q.	- Falls Tensioning Clutch	
	1138.R.	- General Lubrication Recommendations	MAINTENANCE
	1138.S.	- Recommended Lubricants.	
	1113	- Spares	
		- Electric Motors see enclosed book	

DRAWINGS

DRG NO.	17485/A Shts 1 & 2	GENERAL ARRANGEMENT OF DAVITS
DRG NO.	17578	BOLTING PLAN OF DAVITS
DRG NO.	1102-0901/0911	GENERAL ARRANGEMENT OF WINCH
DRG NO.	17700	SECTIONAL ARRANGEMENT OF WINCH
DRG NO.	1151-0101/0111	GENERAL ARRANGEMENT OF F.T. WINCH
DRG. NO.	5506-0801/0901	SECTIONAL ARRANGEMENT OF F.T. WINCH
DRG NO.	5505-0901/1001	SECTIONAL ARRANGEMENT OF LUFFING SCREW GEA
DRG NO.	5660-0302	SECTIONAL ARRANGEMENT OF SHOCK ABSORBER
DRG NO.	5655-0002	SWIVEL SHEAVE BLOCK ASSEMBLY
DRG NO.	5655-0402	BOAT BLOCK ASSEMBLY
DRG NO.	EL 764	WIRING DIAGRAM

INSTALLATION - SPECIAL 'LUM' DAVITS

GENERAL

The shipbuilder should provide a suitable seating under the Davit frame, main winch, falls tensioning winch, shock absorbers and deck blocks all adequate in strength to withstand the indicated loads and all as shown on the General Arrangement.

NOTE: Care should be taken to ensure that all deck seatings are flat and true as possible to avoid distortion of the equipment when bolting down. Shim if necessary.

DAVIT ARMS, FRAMES ETC.

The arms are generally supplied fitted into the davit frames complete with screw gear.

When positioning arm and frames it is important:-

a) That the pivot pins of davits should be in line with each other.

b) That the arms should be set vertically true and parallel to each other.

   This should be carried out by using a plumb line off the centre of each arm suspension lug and lining up with the centre hole in the davit base using shims where required.

c) The suspension lug centres should be held within 10mm of the 12.6 METRE davit centres by measuring over plumb lines in both inboard and outboard positions.

Check that forward and aft arms are fitted to their correct deck seatings. Having bolted the davit frames to the deck, ensure that both davit amrs are in the same position and attach the box section boom by means of the large bow shackles provided. Attach swivel blocks to the boom at required centres by means of the small dee shackles provided.

ROPE SHEAVE BLOCKS

When bolting the deck lead blocks to their prepared seatings, check that the correct double blocks are fixed adjacent to the arm pivots. (See General Arrangement of Davits enclosed). Check also that the horizontal lead blocks are positioned correctly so that ropes will not foul side plates.

If the pivot sheave brakcets on arms are supplied separate then these should be attached to the davit arm with the stop plates on the lower pivot lug on the inboard side of the pivot pin.

SHOCK ABSORBERS

These are supplied one hand only and are simply bolted to their appropriate prepared deck seatings.

The shock absorbers are designed to take the varying fore and aft load distributions of both launch and barge. The helical coil springs are capable of working load adequate for a shock load on the heavier end of the barge but are pre-loaded for the lighter end of the launch. Consequently, the deflection of the shock absorber will vary depending on which boat is being used. At their initial setting the approximate deflections are:- 270mm on barge and 170mm on launch. These deflections can easily be adjusted if required by means of the locknuts inside the end cover.

WINCHES

The main winch and falls tensioning winches should be bolted securely to adequate seatings on the deck, as indicated on the General Arrangement. Check that correct hand of winches are fitted to appropriate Davit Set. Before the winches are run the gearboxes must be filled with the appropriate amount of oil of the recommended grade stated on the Winch arrangements enclosed.

WARNING: Before the main winch is run check that the turning handle safety device on the turning handle shaft is correctly adjusted so that the brake lever CANNOT be lifted when the turning handle is fitted. Adjustment can be made by using the screw provided.

Check also that the turning handle CANNOT be fitted when the power of the winch is on.

LIMIT & SAFETY SWITCHES

The various switches should be supplied already set but can be adjusted if required onboard. The safety switches on the screw gear and winch are adjusted by simply altering the position of the levers on the switch shafts.

WARNING: Before running the luffing winch check that the turning handle CANNOT be fitted when the power to the winch is on.

The luffing limit switches are of the hunting tooth type and are set to trip leaving two screw threads before the end stops are reached. If these switches need to be adjusted then hand winding of the luffing gearbox should be used NOT power winding when adjusting.

The interlock switch on the forward davit luffing winch should be set to cut in/out at approximately half luffed position.

The hoist limit switch on the davit boom is set to give a lift of approximately 1.07m out of the stowed position of the boat.

The winch motors, safety switches and limit switches should be connected in accordance with the circuit diagram enclosed.

ROPE REEVING

The rope is supplied in two lengths per davit, the shorter rope is for the aft davit and the longer rope is for the forward davit.

The main winch drum rope anchorage is of the wedge type. Pass the rope end through the slot in the rope drum flange and out through the wedge pocket. Pull through sufficient rope to make a loop and pass the rope end back through the pocket. Place the rope wedge into the loop and pull rope back through slot pulling the wedge into the pocket until a good tight fit is obtained and the rope is trapped on both sides between the wedge and pocket.

The davit should then be reeved in the sequence indicated on the General Arrangement enclosed, (care being taken not to omit the hoist limit switch operating plate and boat block) and the rope anchored to the falls tensioning winch. Three full turns should be made around the bollard before anchoring the rope with the rope clip.

When both ends of the rope are securely fixed rotate the main winch to wind up all slack rope making sure that the rope is tightly coiled and evenly layered.

IMPORTANT

Check that the boat is level and adjust the ropes at the falls tensioning bollard if necessary.

LAUNCHING BOAT

Close isolater on the starter panel below decks and ensure that the main supply is connected. All subsequent operations are then carried out on deck.

Put luff control,switch to 'OUT', moving the davit arms from the stowed position to the boat hoisting position.

Put luff switch to 'OFF'

Remove gripes and put and hold Hoist Control Switch at 'ON' The boat will be lifted away from the deck until the balance weights ('S') are lifted shutting down the hoist motion and preparing circuit to luffing motion.

Put luff switch to 'OFF'.

During the travel from stowed to outboard positions, and allowing for a maximum 10^{o} list condition, the boat will rise approximately 0.47m due to increase distance between sheaves (x) and (y).

The boat will rise proportionally less at an intermediate outreach.

At the 10^{o} list condition, full outreach, there should be a clearance between the boat block and boom block of approximately 0.28m.

The boat can now be gravity lowered by lifting the brake lever. In doing so, the hoist switches (T) are reset to the hoist motion and the luff circuit is isolated preventing operation of screw gear.

When the boat reaches sea level and the weight is taken off the falls, release brake and unhook boat.

The light falls can now be hoisted (or left hanging as desired) by operating the Falls Tensioning Winch in a hoist direction. As the falls approach the davit boom, although the hoist switch will trip, it is preferable to switch off early and so avoid the blocks from striking due to the very much higher speed.

CAUTION: In order that it is fully effective, sufficient rope should be contained on the falls tensioning drums to allow the boat to drop into the valley of the largest wave formation. Otherwise as the wave recedes the boat remains hanging on the falls "high and dry".

If this happens run the main winch in a lowering direction until enough rope has been wound on the falls tensioning drum.

Since the main winch is gravity controlled it may be necessary to rotate the drum manually using the small handwheel provided.

NOTE: When luffing outboard boat should be hoisted until hoist limit switch trips. It is of course possible to luff without doing this but as soon as davit arms reach the point where limit switch on for Luffing Winch opens circuit, luffing motion will stop.

Luffing limit switches are set to trip leaving two screw threads before end stops are reached.

Manual winding is provided for both hoisting and luffing motions in an emergency and safety interlock switches are provided to ensure the winches cannot be power driven so long as a crank handle is fitted to that particular motion.

RECOVERING BOAT INTO STOWED POSITION

Lower the falls by operating the Falls Tensioning winches in a lowering direction.

When hooks reach the desired position switch off Falls Tensioning Hook on the boat and immediately switch the Falls Tensioning to hoist.

NOTE: Because there are two separate falls tensioning winches, each with their own control, it is possible to tension one rope at a time but it is desirable to tension both together to avoid problems.

The boat will now ride on the water with the falls tensioning winch taking up any slack rope that may appear in the system due to waves lifting the boat.

To hoist the boat, switch the Hoist Control to 'ON' leaving falls tensioning still in operation. The main winch will continue to lift the boat at the normal running speed with the falls tensioning winch retrieving rope at a high speed if the load is taken from the falls.

When the boat is lifted clear of the highest waves the falls tensioning winches should be switched off. The main winch will continue to hoist the boat until the hoisting limit switch is tripped shutting down the main winch and preparing the circuit ready for luffing inboard.

Switch off main hoist.

Put luffing control switch to "LUFF IN" and davit arms with travel inboard. The luffing in operation should be stopped when it is possible to lower the boat into the chocks.

There should be enough slack in the falls when the boat is in its chocks to allow the arm to be continued luffing in until the arms reach their stowed position and shutting down of the luffing winches occurs.

Switch luff control to 'OFF' chock and gripe the boat.

Shut down by opening isolater on starter below decks.

NOTE: For safety of boat crew the electrical scheme has been arranged so that it is impossible to Luff the boat inboard from the outboard position until boat is lifted to davit heads ie., when hoist limit switch has been operated.

Due to the arrangement of hoist rope boat tends to lower a small amount when luffing inboard and this is sufficient to cause hoist limit switch to reset itself and open the interlock contact controlling luffing.

Provided that Luffing In is carried out in one continuous movement the circuit is so arranged that opening of above contacts will not stop luffing in. If however this motion

is stopped for any reason after limit switches reset then it will be necessary to hoist the boat and trip this switch again before further luffing in can be continued.

Additional to above a limit switch is provided in the Forward Davit Luffing Winch arranged to short out this luffing interlock on hoist limit switch from approximately mid luff to fall inboard position. The purpose of this switch is to permit Luffing In or Out of the davit arms without the necessity of lifting boat to davit head, purely over the stowing area on deck.

When boat is stowed always Luff davits inboard until motion is stopped by inboard luff limit switches tripping so ensuring that traversing screws are protected by their covers.

CLASS R ICEBREAKERS G.M. DESIGN 1180-1

FALLS TENSION WINCHES

The prime purpose of a Falls Tension Winch is to keep rope falls taut as the boat rides on the waves either after launching or prior to recovery and even during these operations.

This is achieved by lifting at a high speed as the boat rises and free lowering under damping control as the wave recedes.

This winch is entirely separate from that used for boat recovery (i.e. Main Winch) but standing part of recovery rope is anchored to the winding drum of the Falls Tension Winch.

Basically one end of each rope is anchored to a winding drum on the main hoist winch, while the other end is anchored to a winding drum on the Falls Tensioning Winch with lifting hook hanging from a sheave block in the centre of the rope system giving two part tackle. Obviously if either end of the rope is coiled on to the winding drums by winch rotation then the lifting hook is raised at a speed related to that of the winch.

Unlike the main winch where winding drums are directly coupled to the driving motor through reduction gearing, those on the Falls Tension Winch are coupled to the motor via a spring loaded clutch set to drive with minimum load comprising total weight of slack falls plus return block, but to slip with any load greater than this.

Falls Tensioning is automatically obtained as follows:-
Firstly put FT control switches to "Hoist" when FT winch motors will run in a hoisting direction.

Assuming the boat weight is taken by the falls then FT clutches will slip and drums will not rotate. If however a wave lifts the boat then as weight is relieved from the falls, clutches take up the drive rotating winding drums to take up slack rope at high speed. As boat weight is again taken on the falls clutches slip and drums cease rotating.

As the wave recedes, boat lowers with it and the resultant pull on the falls will rotate the winding drums against the slipping clutch unwinding rope off these drums.

When all rope is wound off, drums cease to rotate and boat hangs on the falls "high and dry" if wave recedes further.

With the above method of tensioning, time constant of the clutch is almost instantaneous ensuring that rope system is kept taut and slack rope is never allowed to develope.

The size of the clutch is deliberately chosen to permit constant slipping without undue heat or wear.

Each boat is lifted on two points and the above system is included for each lifting point giving independent tensioning to cater for differing vertical fore and aft movements of boat caused by rolling action of a wave.

Falls tensioning can be used during launching where it becomes operational immediately the boat touches the water. It must however be borne in mind that before slipping the hooks, the main hoist should be left lowering until sufficient rope is wound on the FT drum to allow for maximum "dip" between waves, otherwise there is a danger of the boat being "air borne" during automatic tensioning. Equally FT winches must be switched off before attempting to slip the hooks as otherwise it will be impossible.

The electrical control is arranged so that light falls can be power hoisted up the ships side, if required, while the boat is away and similarly provision is included for power lowering but in this latter case we must stress that the weight of light falls must be sufficient to overcome frictional losses in rope sheaves.

A limit switch is provided at davit head to prevent over hoisting and this is connected to shut down both Main Hoisting and Falls Tensioning Winches.

When hoisting light falls by FT winch it is adviseable to shut down before limit switch is operated due to the comparatively high hoisting speed.

M A I N T E N A N C E

GENERAL

To ensure the equipment is not allowed to deteriorate due to lack of use, it is essential that the davit and winch are frequently operated through all operations. This should include running the winch for at least half its normal operating time to ensure maximum oil dispersion around winch gearbox.

IMPORTANT: If, during the above operations, any deterioration of performance or defect of any part is noticed it should be investigated and rectified without delay as YOUR LIFE may depend on this equipment functioning efficiently in an emergency.

WINCH

There are no greasing points on the winch. The gearbox oil level should be checked occasionally and topped up, if necessary, to the bottom of the oil level plug hole. Replace completely approximately every 5 years with oil type Mobilgear 629 or equivalent.

Provided no deterioration in performance is noticed the brake mechanism will only need inspection at approximately 12 monthly intervals. Remove all tension from rope before working on brakes.

To dismantle the brake mechanism to inspect brake shoes. First remove handwheel, then remove setscrews from cover plate and remove, relieving weight on brake lever to release main brake. The main brake shoes can now be inspected for wear and should be replaced with a new pair if either shoe has worn to a 2mm. thickness in any place.

To withdraw main brake drum and inspect the centrifugal brake shoes, Remove the circlip retaining brake drum and remove drum assembly from shaft. If on inspection the lining of any centrifugal brake shoe has worn down to the rivets in any place they should be replaced. Also replace any badly rusted springs, damaged circlips, and damaged or worn oil seals.

The ratchet mechanism housed within the brake drum should need no regular maintenance. It should be inspected every 5 years, cleaned out, and the springs replaced if worn. Care must be taken not to damage seals. If damaged they should be replaced. When re-fitting the ratchet, add 20 millilitres of oil, Mobilgear 629 or equivalent (after all parts are coated with oil) on assembly.

MAINTENANCE.

DAVITS.

The Davits should be run out to the embarkation position and back to the stowed position at regular intervals. During this operation check that all the equipment functions as it is meant to.
DO NOT DELAY IN RECTIFYING ANY DEFECT OR IRREGULARITY - LIFE COULD DEPEND ON THIS EQUIPMENT, AND IT MUST BE CORRECTLY MAINTAINED SO THAT IT WILL FUNCTION EFFICIENTLY IN AN EMERGENCY.

All greasing points shown on the General Arrangement of Davits should be greased regularly.

The wire ropes should be visually inspected at regular intervals for any sign of wear or damage, which if found should be rectified as soon as possible.
The wire rope should be regularly lubricated around davit and on rope drum. On no account should the rope be allowed to rust or become dry.

WINCH.

The winch gearbox oil level should be inspected regularly and topped up when no level shows through inspection plug.
It is essential that the centrifugal and main lowering brakes are kept in good order and should be regularly inspected. If it is found necessary to adjust the safety device this should be used as an indication that the brakes are wearing and need attention. In any case the brakes should be inspected annually and at the same time the safety device should be adjusted if necessary. The ratchet device should not be disturbed until a major overhaul is carried out or unless damage is suspected.

When the brake centre has been removed from the shaft the inside of the brake housing should be cleaned.

F.T. WINCH

As with the main winch, the gearbox oil level should be inspected regularly and topped up when necessary.

nt before dismantling to note direction of rotation
nd to re-assemble the same way.

embly of brake, remove any accumulated scale or dust
nings from the inside of the brake housing.

asons the safety device adjusting screw must
justed.

GEAR

il level should be kept topped up, to the bottom of
plug hole with the screw in a vertical position,
'D' on Lubrication Chart enclosed.

points should be regularily greased. During the
ations visually inspect the screw, which should at
coated with grease.
on Lubrication Chart.)

ne above there should be no other regular maintenance

eeping the gearbox oil level topped up to the bottom
evel plug hole (oil Code 'E' on Lubrication Chart)
regular maintenance required.

contactor contacts condition for any sign of
on or other signs that could cause arcing and
a possibility of them welding together.
2012)

FALLS TENSIONING WINCH

SETTING CLUTCH SLIP TORQUE (READ IN CONJUNCTION WITH SECTIONAL ARRANGEMENT)

The clutch which is situated inside the winch on the end of the drum shaft 5111-0011 has been preset so that it slips when the load on the winch is in excess of the weight of the block and rope falls ie., it will retrieve the light falls only. This load produces a slipping static torque on the clutch calculated at approximately 230 lbs ft. The clutch should generally need no attention, however, in the event of a major overhaul or should the winch fail to retrieve the light falls, the following procedure should be followed.

1) Drain all oil from case and remove or slacken rope from drum.

2) Remove cover plate 5402-0511 and drum retaining plate 5402-0411.

3) Fit M30 set pin 50 long into drum end of shaft.

4) Remove locking wire from clutch adjusters.

5) Attach a torque wrench to M30 pin (torque to be applied via the M30 pin in a clockwise direction).

6) The clutch torque can be increased by screwing adjusters in and decreased by screwing out, but it is important to adjust all 8 adjusters an identical amount. The suggested adjustment per torque trial ia 1/6 of a turn.

7) When the required torque is obtained remove the M30 pin, replace all items removed and re-fill winch case with clean oil before operating winch.

8) Final check, run winch in "FALLS TENSIONING" and check that the motor current is within the full load current as stated on the motor name plate.

GENERAL LUBRICATION RECOMMENDATIONS FOR DAVITS & WINCHES.

(Refer to General Arrangement enclosed for Lubricant Code).

LOCATION.	LUBRICANT CODE.	METHOD OF APPLICATION.	FREQUENCY OF LUBRICATION.
Rope sheaves, plain bearings, ball bearings, roller bearings, track rollers, pivot pins, trigger levers and all grease nipple applications.	A.	Grease Gun.	Regular greasing dependent upon use and conditions.
Exposed Gears.	B.	Hand applied.	Regular greasing dependent upon use and conditions.
Wire Rope.	C.	Hand applied.	Regular greasing dependent upon use and conditions.
Enclosed gears, chain drives, worm gears, slewing drives.	D.	Oil bath.	Change oil after first 200 running hours then every 4 years.
Internal Ratchet Brakes.	D.	Greased and sealed at works.	If brake drum is opened apply two teaspoonfuls of lubricant D before re-sealing.
Hydraulic circuits.	E.		
Electric motor bearings.	F.	Packed grease.	Check and re-pack every 2 years.
Dashpot Control Mechanisms.	Some types of electrical control gear depend upon oil to operate the dashpot mechanism. This is not for lubrication purposes and a small bottle of the appropriate fluid will be supplied with the equipment where necessary.		

RECOMMENDED LUBRICANTS

LUBRICANT 'A'	Mobilux 2 or Mobilplex 47
LUBRICANT 'B'	Mobiltac D, Mobiltac E or Mobiltac 81
LUBRICANT 'C'	Mobilarma 798 or Mobiltac E
LUBRICANT 'D'	Mobil Compound BB or Mobilgear 629
LUBRICANT 'E'	Mobil DTE 13 or Mobil DTE 24
LUBRICANT 'F'	Mobilux 2 or Mobilplex 48

SPARES.

ORDERING INFORMATION.

When ordering spares as much of the following information as possible should be given.

ORIGINAL SHIPBUILDER. See front page in book.
" SHIP OR YARD NO. " " " "
SHIPS NAME. –
WELIN WORKS REFERENCE NO. " " " "

TYPE OF EQUIPMENT.

DESCRIPTION OF PART.
PART NO. See drawings enclosed.
NO. OFF REQD.

DELIVERY REQUIRED.
" ADDRESS.

INVOICE ADDRESS IF DIFFERENT.

YOUR CONTACT FOR QUERIES.

WIRE ROPE SPECIFICATION.

MAIN BOAT FALLS.

.....22.... m/m dia. .....6/36.....construction .....28700.....kgf Breaking strain, with a 6:1 Factor of safety. Galvanised and lubricated, plain ends.

Length(s) Required. 1off80 M : 1off70·25M.....long. per set of Davits.

TRICING PENDANT.

.....m/m dia. .....const. .....kgf Breaking strain.

Lanyard thimble spliced into one end and an ordinary thimble at the other large enough to take the eye of a ..... small Dee shackle. Distance between bearing points of thimbles .....m/m.

2 lengths per set of Davits.